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# ILLUMINATION

# CONTROL



WESTON



## THE NEED FOR ILLUMINATION CONTROL

The importance of adequate illumination to the purchaser of light, whether a municipality, industrial plant, office building or school, can hardly be over estimated, for it has become a new and vital factor in the general scheme of economic betterment. Sufficient light increases the factory and office worker's productive capacity; it contributes to the student's ability to assimilate education; and it reduces the high rate of street accidents which occur during the congested evening periods. Huge expenditures have been made to provide modern lighting, yet frequently no modern method of controlling these elaborate installations has been employed. Time switches and kindred apparatus have long been used for this purpose but the demands of today's high speed traffic and industrial efficiency call for a new method of control—a control which will provide artificial light exactly when it is required. The Model 709 Illumination Control Relay, recently perfected by Weston, injects a new meaning into the terse phrase, "Better Light—Better Sight." Today we think in terms of Better Light + BETTER CONTROL = Better Sight.

Today we want light when it is needed—not necessarily when it is time for the sun to set. If it is a dark, rainy day we need artificial light earlier; if the sun shines we would like to save power. In other words, time and the intensity of daylight are not related. The operation of the Model 709 is not based upon time; its action is governed in accordance with a predetermined low level of natural light. The PHOTRONIC Cell, or "Electric Eye," is used as the determining or controlling element because of its instantaneous response to light variations and its permanent characteristics. The Model 709 Illumination Control Relay turns lights on at levels of light intensity which are insufficient for the indoor worker, or dangerous to traffic conditions. When natural light returns to adequate levels, the lights are automatically turned off, thereby eliminating waste.

## WESTON MODEL 709 ILLUMINATION CONTROL RELAY

The Model 709 Illumination Control Relay is a new PHOTRONIC device for automatically controlling either outdoor or indoor lighting systems. This relay turns lights on and off in accordance with the natural light intensity so that a predetermined level of illumination may be maintained. Model 709 consists of a small panel on which are mounted two Weston Sensitrol Relays; one for turning lights on and the other for turning them off. Each relay may be independently adjusted and the value at which it operates may be selected from a calibrated scale. The advanced design of the contact circuit in Sensitrol Relays permits high sensitivity combined with a relatively high contact pressure . . . something hitherto impossible in a single sensitive relay. The energy for their operation is obtained from either one or three of the unique light sensitive PHOTRONIC Cells.

The performance of the Model 709 as a unit is dependent upon the positive action of the Sensitrol Relays. For the reader who is not familiar with electrical apparatus it may clarify this description by explaining just what a relay does. The Sensitrol Relays used in the Model 709 are simply contact making devices for closing a primary circuit. The energy delivered by one PHOTRONIC Cell is sufficient to operate the relays and therefore no batteries or auxiliary apparatus is necessary. In order to make or break a circuit it is necessary to have two contacts, one movable and the other stationary. The stationary contact in the Sensitrol Relay is a small permanent magnet and the movable contact is a magnetic "rider" which is attached to the instrument pointer. Light impinging upon the PHOTRONIC Cell

generates electrical energy which keeps the contacts open. When the light diminishes, the energy is decreased proportionally until the relay pointer swings the movable contact into the magnetic field of the permanent magnet stationary contact. It is then drawn firmly against it, producing an unusual contact pressure and preventing chattering.

The above paragraph describes the action of the "turn on" relay. The "turn off" relay operates on exactly the same principle but the action takes place when the natural light intensity is increasing, not diminishing.

When daylight diminishes to a predetermined level the contacts of the "turn on" relay close and complete a circuit to a small induction motor which, in turn, drives a small cam. This cam rocks a mercury tube switch, completing the lighting circuit. At the same time it locks out and resets the "turn on" relay. The motor stops, leaving the lights on and releasing the "turn off" relay from its locked out position so that when the light intensity rises to the desired operating value, the lights will be turned off. This same procedure occurs when the "turn off" relay makes contact. The entire operation is completed in about one minute. This operating interval is advantageous as it permits the stabilization of light conditions thus preventing continuous operation due to shadows falling upon the PHOTRONIC Cell. The above description is common to the Illumination Control Relays used for both interior and exterior illumination control. The difference between the two will be described as follows.



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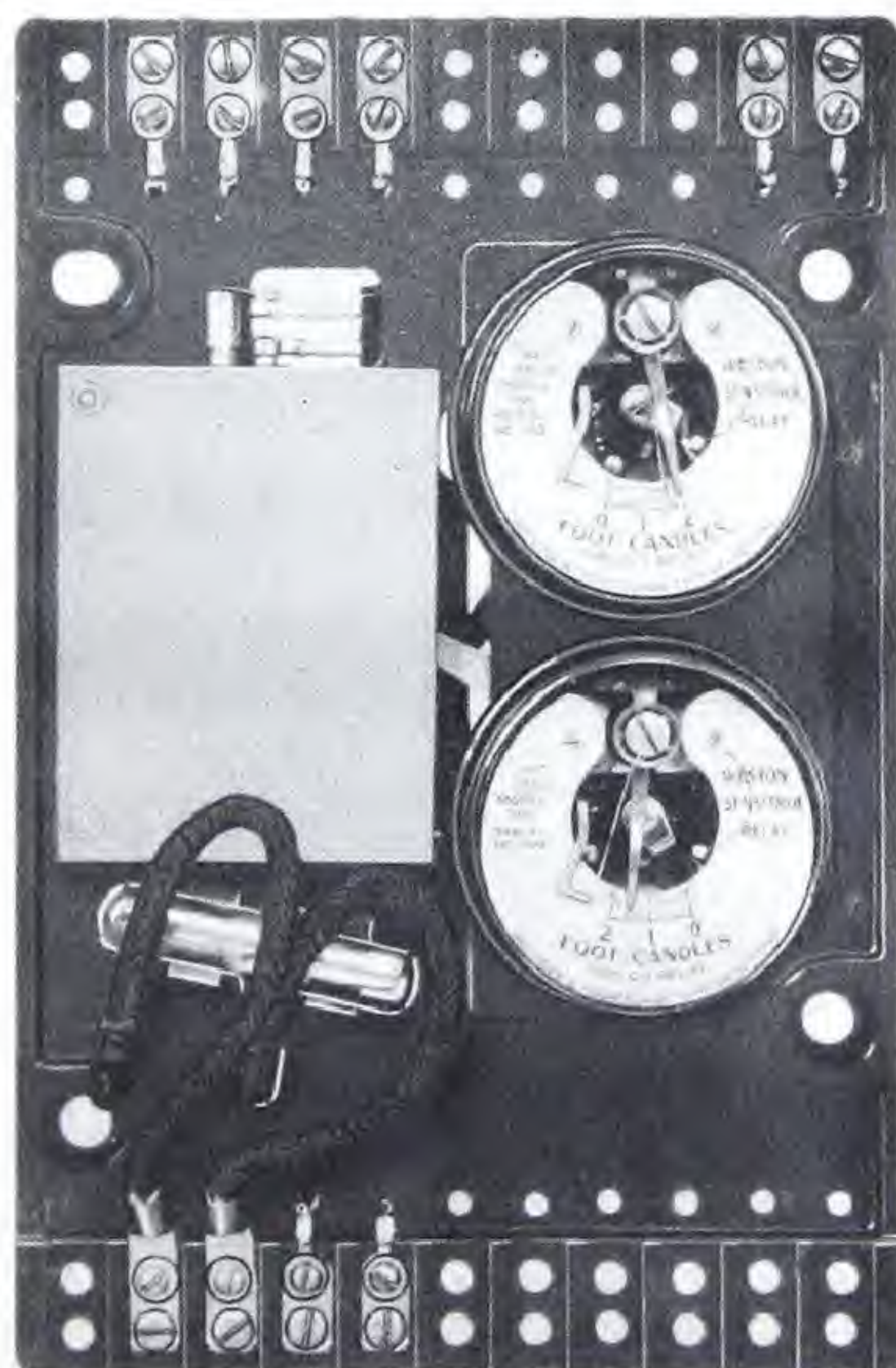
## STREET LIGHTING OR OUTDOOR CONTROL

For street lighting applications each Sensitrol Relay is calibrated from 0 to 2 foot-candles permitting a low operating value of 0.5 foot-candle. The Model 709 may be adjusted to operate at any point within the range of 0.5 to 2.0 foot-candles. A cast aluminum weatherproof housing may be supplied for mounting the relay panel out of doors. However, due to the fact that the PHOTRONIC Cells may be located at a point distant from the control panel, it is possible to run leads from the cells to any convenient point indoors. If it be possible to house the control panel indoors, the steel conduit box is recommended. A weatherproof light target, containing three PHOTRONIC Cells, actuates the relays.



INDOOR LIGHT  
COLLECTOR

MODEL 709 RELAY



OUTDOOR LIGHT  
COLLECTOR

## INTERIOR ILLUMINATION CONTROL

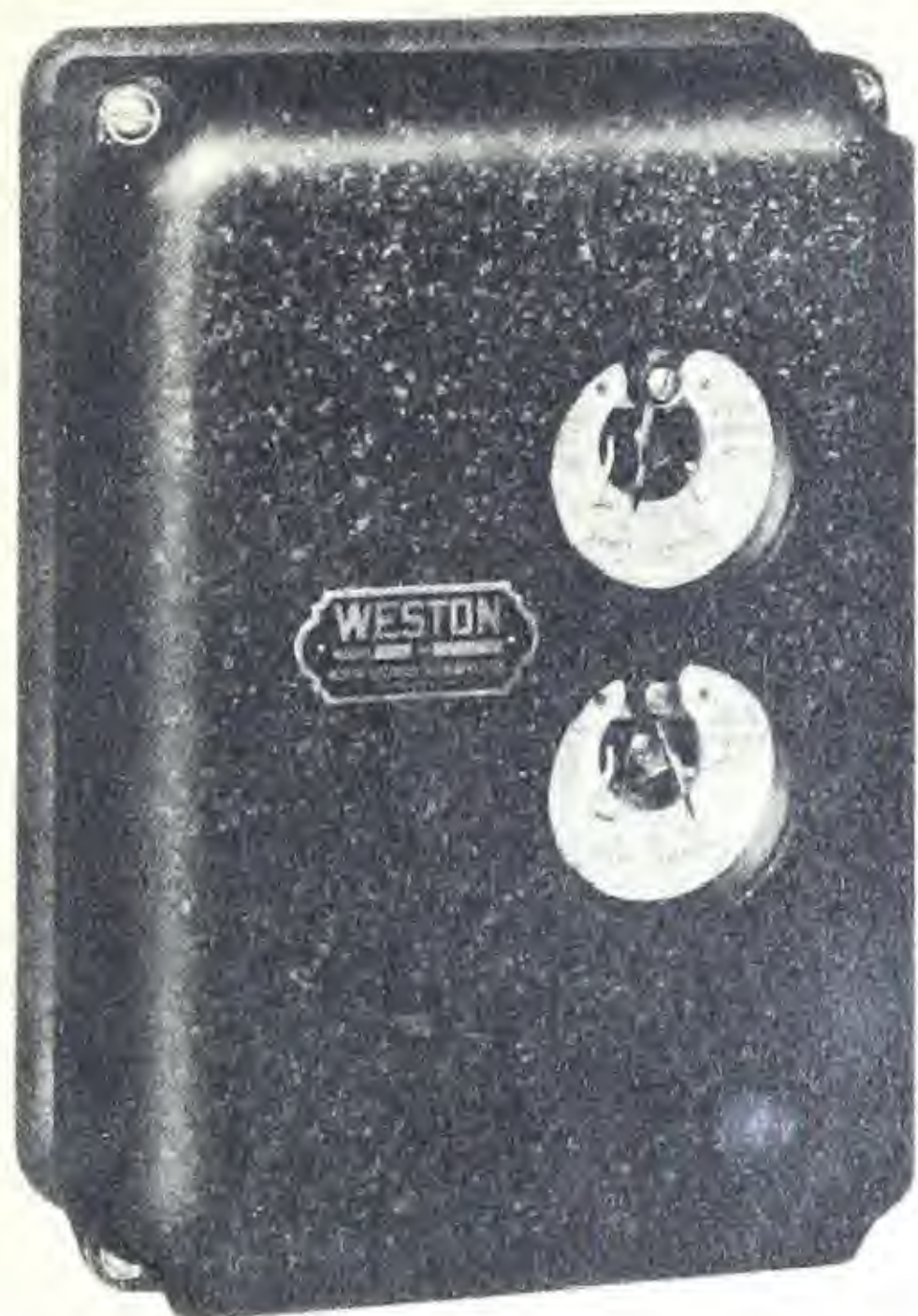
For interior illumination control, the relay panel is assembled in an attractively finished cast aluminum cabinet, suitably designed for wall mounting. A single PHOTRONIC Cell, enclosed in a suitable case with a glass front, may be mounted in any location desired. The relay scales are calibrated from 10 to 20 foot-candles "turn on" and 20 to 30 foot-candles "turn off" although any range may be supplied. Flexibility in adjustment between the "turn on" and "turn off" values is necessary to take care of the increase in illumination furnished by the artificial light. This increase varies with each installation due to the location of the lighting fixtures, and the location of the cell in respect to the natural light sources. In order to accommodate a large variety of conditions, this range of adjustment for the "turn on" and "turn off" values is necessary. The operating point is selected by simply moving an index arm over the calibrated scale.



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## INSTALLATION

Installation is simple. It is only necessary to mount the relay panel on a wall or post, set the PHOTRONIC Cell and run leads from the relay panel to the connections on the existing switch box. The small motor requires approximately two watts for a period of one minute; the energy being obtained from the most convenient 110 volt 60 cycle source. No energy is consumed except during this period of operation. Operating cost is therefore negligible.



CRACKLE-FINISHED CABINET FOR INDOOR USE

OUTDOOR CONDUIT BOX



INDOOR CONDUIT BOX

## PRICES

MODEL 709 complete, for Interior Control—Mounted in a black crackle-finished cabinet .....	\$140.00
MODEL 709 complete, for Outdoor Control—Mounted in a weatherproof, cast aluminum box .....	\$180.00
MODEL 709 complete, for Outdoor Control—Mounted in a steel knockout conduit box .....	\$160.00

**WESTON ELECTRICAL INSTRUMENT CORPORATION**  
**NEWARK, NEW JERSEY**